Part 9 · Spot the Mistake

Each solution below reaches a wrong answer, and exactly one step is to blame. Find the first wrong step and rewrite it correctly. Marking other people's work is the fastest way to stop making their mistakes.

🔍 Spot the Mistake

Surface area of a playing top (cone + hemisphere)

Step 1. The top is a cone surmounted by a hemisphere sharing the same radius.

Step 2. Total surface area = TSA of cone + TSA of hemisphere.

Step 3. So we add $\pi r(l+r)$ and $3\pi r^2$.

_____ The first wrong step is Step _____ . What should it say?

_____

🔍 Spot the Mistake

Volume of a cone-on-hemisphere toy

Step 1. The toy is a cone of height 2 cm on a hemisphere of radius 2 cm.

Step 2. Volume = volume of cylinder of the same radius and height − volume of cone.

Step 3. So volume = $\pi r^2 h - (1/3)\pi r^2 h$.

_____ The first wrong step is Step _____ . What should it say?

_____

🔍 Spot the Mistake

Finding the exposed area of a cube with a hemispherical depression

Step 1. A hemisphere of radius r is scooped out of one face of a cube of edge a.

Step 2. Surface area of remaining solid = TSA of cube + CSA of hemisphere.

Step 3. So area = $6a^2 + 2\pi r^2$.

_____ The first wrong step is Step _____ . What should it say?

_____

From a playing top to a bird-bath, every combined solid this chapter throws at you reduces to the same two golden rules: surface areas only count what is still exposed, volumes simply add. Get those two sentences right and the arithmetic takes care of itself. □□